The Neuroscience of Mindfulness

The Mindful Brain

Tina Forster & Hana Villar, 12th June 2015
Definition of Mindfulness

Mindfulness is the **awareness** that emerges from **paying attention** in a particular way:

*on purpose, in the present moment and non-judgmentally*

(Kabat-Zinn, 2003)
Mindfulness Techniques

- Pay close attention to your breathing, especially when feeling intense emotions.
- Notice—really notice—what you’re sensing in a given moment.
- Recognize that your thoughts and emotions are fleeting and do not define you.
- Tune into your body’s physical sensations.
Main Mindfulness Practices

- body scan
- mindfulness of breath (sitting)
- open awareness
- walking & movement practices
- compassion/kindness training
ABCs of Mindfulness Meditation

Develop **Awareness**
- (discernment of present moment experience)

Learn to **Be with** experience
- (do not avoid/push away/distract)

Make skilful **Choices**
- (non-reactivity, actions not mood-dependent)
Non-Evaluative Attention

Re-training Attention Towards:
- Curiosity
- Nonjudgmental Thinking
- Equanimity
- Non-Anticipation
- Non-Reactivity
- Non-Rumination

*(FFMQ: Baer et al., 2006, 2008)*
Awareness of Internal & External Stimuli

**Notice** and **discern** moment-by-moment:
- thoughts
- feelings
- bodily sensations
- urges/actions

**Dis-identify** with:
- thoughts
- feelings
- bodily sensations
(simply mental events that come and go)
Mindfulness Benefits

• Overactive/unproductive ruminative, predictive and worry networks can be disengaged *(Berkovich-Ohana et al., 2000)*

• Alters habitual responses in favour of intentional, skillful decision-making *(Chiesa et al., 2011)*

• Greater awareness of automatic pilot/inattentive mode

• Facilitates noticing thoughts come and go and letting them go (decentering) *(Hargus et al., 2010; Teasdale, 1999)*

• Alleviates anxiety, stress, insomnia, chronic pain *(Winbush et al., 2007; Jain et al., 2007; Hoffman et al., 2010)*

• Improves quality of life and creativity *(Manocha et al., 2012)*
Mindfulness Research Findings

• Trains mind in attention: sustaining, selecting and shifting between modes (Malinowski, 2013)

• May initially activate attention to body (Kerr et al., 2013)

• Lowers stress reaction to negative thoughts and reduces self-referential bias – seen in fMRI (Lazar et al., 2011; Taylor et al., 2013)

• Reduces cortisol levels and boosts immune system (Tang et al., 2009)

• Self report studies show decrease in anxiety, stress, negative rumination, judgmental thinking (Hoffman et al., 2010; Roemer et al., 2006)

• Increases cortical thickness and changes brain structure (Lazar et al., 2005; Fox et al., 2014)

• Disengages Default Mode – background neuronal activity responsible for rumination and mind wandering (Guo et al., 2014)
Mindfulness and the Brain

Brain areas involved and their function (Tang et al., 2015):

- **Attentional Control**: Anterior Cingulate Cortex and Striatum
- **Emotion Regulation**: Multiple Prefrontal Regions, Limbic Regions, Striatum
- **Body/Self-Awareness**: Insula, Medial Prefrontal Cortex, Posterior Cingulate Cortex & Precuneus
Mindfulness and the Brain

Brian networks (connecting different brain structures)

- Task Positive Network
- Vs
- Task Negative Network/default Mode Network